

SWOT

Wet tropospheric correction issue

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General context

- Additional delay due to tropospheric water vapor to be corrected
- Between 0 and 50 cm, with a high spatial and temporal variability
- Estimation provided by a specific nadir microwave radiometer instrument for current altimetry missions

SWOT specificities

- Swath altimetry
 - Need for an accurate wet tropospheric estimation across-track
- High resolution altimetry
 - Need for a correction with the required resolution
- Oceanography, hydrology and coastal scientific objectives
 - Different issues to be addressed
- Ka band
 - Strong attenuation by rain and clouds

Specific objectives and approach

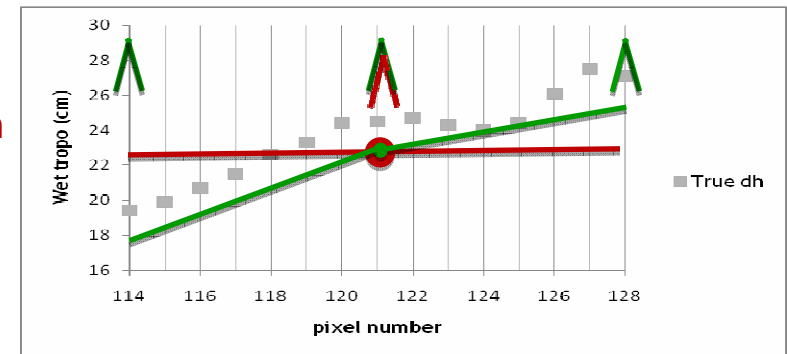
- To define the need in terms of instrument design and processing to get a SWOT wet tropospheric correction compatible with the hydrology and oceanography mission requirements
- First CLS/CNES study performed in 2011 using AMSR-E to characterize the water vapor across-track variability:

1 central feed :

=> 25% of the scans containing a pixel with an error > 1 cm

3 feeds :

=> 2% of the scans containing a pixel with an error >1 cm



- To extend this study to better characterize the need in terms of
 - Measurement sampling
 - Measurement resolution => Are AMSR-E products at a 30km resolution suitable ?
 - Estimation accuracy
 - Not only for oceanography but also hydrology
- Analysis of AltiKa measurements to assess the effect of rain and clouds in Ka band

key Phase-A SWOT issue addressed

- Is a nadir-looking water vapor radiometer sufficient for making wet tropospheric corrections consistent with the science mission requirements ?
- In terms of sampling :
 - how many horns ?
 - Viewing where into the swath ?
- In terms of resolution : which frequency ?
 - Higher frequency may provide an estimation of the wet tropo correction with a much better resolution
 - Higher frequencies are less sensitive to surface emissivity allowing accurate estimation in case of mixed surface pixels (coastal/hydrology)